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Attorney Docket No. 2000.16

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:  
Runkle et al.

Group Art Unit: 1732

Serial No. 09/851,242

Examiner: S. Staicovici

Filed: May 8, 2001

For: METHOD FOR MAKING A HOLLOW FIBER MEMBRANE CONTACTOR

VIA FACSIMILE  
703-872-9306  
Total Pages: 17

REPLY BRIEF TO EXAMINER'S SUPPLEMENTAL ANSWER

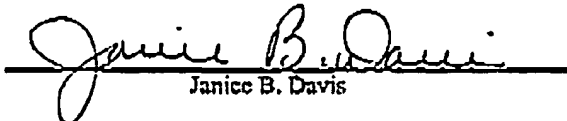
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Dear Sir:

This Reply Brief is filed in response to the Examiner's  
Supplemental Answer mailed March 29, 2005.

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and  
Trademark Office on May 18, 2005.

  
Janice B. Davis

#### I. REAL PARTY IN INTEREST

The real party in interest is Celgard Inc., the assignee of record in the instant application.

#### II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

#### III. STATUS OF THE CLAIMS

Claims 1-2, 4-5, 16-19, and 21-27 are rejected under 35 U.S.C. 103(a), and they are the subject of this appeal. Claims 3, 20, and 28 are canceled. Claims 6-15 are withdrawn from consideration in view of a restriction requirement.

#### IV. STATUS OF AMENDMENTS

Applicant has filed an Amendment After Final Rejection to cancel Claims 20 and 28.

#### V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The following is a concise explanation of the subject matter defined in independent Claims 1 and 21.

The instant invention, according to Claim 1, is a method of making a hollow fiber membrane contactor. (Specification, Page 4, Lines 12-13). The method of making a hollow fiber membrane

contactor, according to Claim 1, includes the following steps: (1) winding a hollow fiber fabric around a center tube; (2) first potting the fabric and the tube together; (3) forming thereby a unitized structure; (4) placing the structure into a shell; (5) second mold potting the structure into a space between the structure and the shell; and (6) forming thereby a cartridge. (Specification; Page 7, line 16 to Page 18, Line 25).

The instant invention, according to Claim 21, is a method of making a hollow fiber membrane contactor. (Specification, Page 4, Lines 12-13). The method of making a hollow fiber membrane contactor, according to Claim 21, includes the following steps: (1) winding a hollow fiber fabric around a center tube to a diameter of at least six inches; (2) head potting the fabric and the tube together; (3) forming thereby a unitized structure; (4) placing the structure into a shell; (5) mold potting the structure and the shell together by injecting a potting material into a space between the structure and the shell; and (6) forming thereby a cartridge. (Specification; Page 7, line 16 to Page 8, Line 25; and Page 9, lines 8-11).

#### VI. GROUND'S OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-2, 4-5, 16-19, and 21-27 are rejected under 35 U.S.C. 103(a), and they are the subject of this appeal.

## VII. ARGUMENT

Claims 1-2, 4-5, 16-19, and 21-27, for the reasons explained hereinbelow, are non-obvious under 35 U.S.C. 103(a); thus, the above-mentioned 103 rejections are improper, and they must be removed.

### A. CLAIMS 1-2, 4-5, AND 19 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 1-2, 4-5, 19 are non-obvious under 35 U.S.C. 103(a) over U.S. Patent No. 5,186,832 ("Mancusi") in view of U.S. Patent No. 4,800,019 ("Bikson").

To reject claims in an application under section 103, an examiner must show a *prima facie* case of obviousness. In *re Deuel*, 51 F. 3d 1552, 1557, 34 U.S.P.Q.2D 1210, 1214 (Fed. Cir. 1995). All words in a claim must be considered in judging the patentability of that claim against prior art. In *re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (CCPA 1970). To establish a *prima facie* case of obviousness, the following three basic elements must be met: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) the prior art reference or references when combined must teach or suggest all the

claim limitations; and (3) there must be a reasonable expectation of success. MPEP § 2143. In addition, if an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F. 2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Claims 1-2, 4-5, 19 are non-obvious because the Examiner has failed to show all of the required elements to establish a *prima facie* case of obviousness.

The Examiner has failed to show that the combined teachings of the prior art references cited against the instant Application discloses all of the required features of the instant invention, i.e. two potting steps. Examiner's argument is based on the notion that Mancusi discloses two potting steps. In Examiner's Supplemental Answer, the Examiner notes that "throughout the prosecution of the instant Application, it has been shown that Mancusi specifically teaches the basic claimed process of making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core (winding), potting the fabric and core together to form a an assembly (first potting), placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) by potting of tube sheets to the

interior of the housing. (See Col. 8, Lines 44-48, Col. 9, Lines 1-7, and 60-68 and Col. 10 (It is believed to be erroneously designated as Column 9 in Examiner's Supplemental Answer), Lines 41-60). (See Examiner's Supplemental Answer Page 20, Line 8-14). Throughout the Examiner's Supplemental Answer, the Examiner also repeatedly notes that "Mancusi specifically teaches potting of the tube-sheets to the interior of the housing. (See Col. 9, Lines 22-27)." (See, For Example, Examiner's Supplemental Answer Page 3, Lines 21-22). Additionally, the Examiner notes that "in Column 10, Line 50-60, Mancusi specifically teaches that the bundle ends can be sealed to the housing interior as needed, by simply applying an appropriate amount of resinous potting material to the edge adjacent the bundle ends..."

However, the Examiner is entirely in error to state that "throughout the prosecution of the instant Application, it has been shown that Mancusi specifically teaches the two potting steps of the instant invention." If this was true, then why the Board of Patent Appeals and Interferences would remand the case back to the Examiner to clearly state his reasoning for the above rejections. Mancusi does not disclose the two potting steps of the instant invention for the reasons explained hereinbelow.

The relevant portions of Mancusi cited by the Examiner as discussed hereinbelow include the following:

First, the Examiner is correct in characterizing the following portion of Mancusi as the "winding" step:

"The fabric-like array and integrally-bonded turbulence-promoting web is then wound onto the core surface (or itself, if no core is used) to form a spirally-wound membrane bundle having two bundle ends communicating with the mandrel bore." (Column 8, Lines 44-48).

Second, the Examiner is correct in characterizing the following portion of Mancusi as the "first potting" step:

"Next, the two ends of the bundle are potted in resinous potting material serving to seal each of the bundle ends into a monolithic tube sheet and complete the cartridge (only potting step). Both the materials and the basic methodology for carrying out potting to form tube sheets are well known in the art, as shown, for example, in the Caskey U.S. Pat. No. 4,961,760 which is hereby incorporated herein by reference." (Column 9, Lines 1-7).

Third, the Examiner, however, is in error to characterize the following sections as the second potting step.

A. "Cast-in-place modules according to the invention can be made by the steps of: (1) starting with (a) a bundle prepared as discussed above, and (b) a conventional cast-in-place housing, which is generally made of plastic; (2) inserting the bundle into the housing; (3) potting both of the bundle ends after sealing the bundle ends with a potting cup clamped over each end of the housing (only potting step); and (4) providing suitable end caps and ports." (Column 8, Line 60 to Column 9, Line 3).

B. "In such cases, according to preferred embodiments of the invention, potting is accomplished by forming the end seals for the bundle ends simultaneously with the winding of the array and web into a bundle, instead of employing a subsequent potting step. This potting operation is accomplished by putting down continuous resinous potting material lines at both bundle ends beginning at the unwound edge of the fabric facing and adjacent the nip with the axis, and proceeding along the fabric edge, forming continuous end seals at both bundle ends extending to the perimeter of the bundle. The width of the end seals generally should be great enough to withstand the full operating pressure of the cartridge. The bundle ends can be sealed to the housing interior as needed, by simply applying an appropriate amount of resinous potting material to the edge adjacent the bundle ends. Alternatively, a ring-shaped fitting designed to tightly rest against the end of the housing interior can be fabricated (e.g., injection molded), and adhesively attached to the edge adjacent the bundle end." (Column 10, Lines 41-60).

C. "After the bundle is installed in the housing, the tube sheet(s) adjacent to the bundle end(s) with exposed lumens is(are) sealed to the interior of the housing, to positively prevent fluid flow between the shell side and the lumen side without passage through the membrane." (Column 9, Lines 22-27).

The Examiner has failed to show the second potting step because the Examiner has misconstrued the abovementioned three portions of Mancusi for the reasons stated hereinbelow.

With regard to preceding portion of Mancusi designated above as section "A," this section discloses the method of forming the tube sheets, and there is only one potting step.

With regard to preceding portion of Mancusi designated above as section "B," this section teaches the formation of tube sheets



simultaneously with the winding step. Furthermore, Mancusi discloses that bundle ends can be sealed to the housing interior by simply applying an appropriate amount of potting material. However, Mancusi employs the term bundle ends to refer to end point of the bundle of fibers prior to formation of the tube sheets, i.e. end seals. Therefore, sealing bundle ends to the housing interior by simply applying an appropriate amount of potting material does not refer to a second potting step because no precedent potting step has occurred yet, i.e. no tube sheets has been formed; thus, there is only one potting step. In addition, Mancusi utilizes the term end seals to show that formation of tube sheets has occurred, as used in section "B." Therefore, Mancusi discloses only one potting step in section "B."

With regard to preceding portion of Mancusi designated above as section "C," this section discloses that bundle ends are sealed to the interior of the housing. However, Mancusi employs the term bundle ends to refer to end point of the bundle of fibers prior to formation of the tube sheets, i.e. end seals. Therefore, sealing bundle ends to the housing interior does not refer to a second potting step because no precedent potting step has occurred yet, i.e. no tube sheets has been formed; thus, there is only one potting step. In addition, Mancusi utilizes the term end seals to show that formation of tube sheets has occurred, as shown in the

bolded portion of section "B." Therefore, Mancusi discloses only one potting step in section "C."

Therefore, the Examiner has failed to show that the combined teachings of the prior art references cited against instant Application discloses all of them required features of the instant invention, i.e. two potting steps.

Additionally, it is a burden upon the Examiner to show a suggestion or motivation to modify the teachings of the prior art references cited against the instant Application to achieve the required features of the instant invention, i.e. two potting steps. The Examiner, however, attempts to circumvent his burden by conclusively stating that "throughout the prosecution of the instant Application, it has been shown that Mancusi specifically teaches - (second potting)." (Examiner's Supplemental Answer, page 25, Lines 6-13). Again, if this was true, then, why the Board of Patent Appeals and Interferences would remand the case back to the Examiner to clearly state his reasoning for the rejections. The answer is obvious; the Examiner has never shown any suggestion or motivation to modify the teachings of the prior art cited against the instant Application to modify their teachings to achieve the required features of the instant invention, i.e. two potting steps. Thus, the Examiner's argument regarding showing a motivation or a

suggestion cannot stand. Accordingly, there is no motivation or suggestion to modify the teachings of the prior art cited against the instant Application to achieve the required features of the instant invention, i.e. two potting steps.

Therefore, the Examiner has failed to show all of the required elements to establish a *prima facie* case of obviousness.

In addition, it is also noted that in Column 10, lines 42-45 Mancusi states "... potting is accomplished by forming the end seals for the bundle ends simultaneously with the winding of the array and web into a bundle, instead of employing a subsequent potting step." This is a clear teaching away from the use of two potting steps. Teaching away from the art is per se demonstration of a lack of *prima facie* case of obviousness. In re Dow Chemical Company 837 F. 2d 469, 5 U.S.P.Q.2d 1529 (Fed. Cir. 1988).

Finally, throughout the Examiner's Supplemental Answer with regard to the rejections of instant claims under 35 U.S.C. § 103(a), Mancusi is included in each and every one of these rejections to provide the basis for Examiner's argument, i.e. teaching of two potting steps. Since Mancusi only teaches a single potting step, then, there is no teaching of two potting steps. Therefore, since the basis for Examiner's argument does not stand,

then, it follows that the Examiner's argument shall not stand either. Therefore, Claims 1-2, 4-5, and 19 must be non-obvious under § 103(a).

B. CLAIMS 16-18 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 16-18 are also non-obvious under § 103(a) for the reasons stated above in section A.

C. CLAIMS 1-2, 4-5, 16 AND 18-19 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 1-2, 4-5, 16, and 18-19 are also non-obvious under § 103(a) for the reasons stated above in section A.

D. CLAIMS 17 IS NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claim 17 is also non-obvious under § 103(a) for the reasons stated above in section A.

E. CLAIMS 21-23, AND 27 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 21-23, and 27 are also non-obvious under § 103(a) for the reasons stated above in section A.

F. CLAIMS 24-26 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 24-26 are also non-obvious under § 103(a) for the reasons stated above in section A.

G. CLAIMS 21-24, AND 26-27 ARE NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claims 21-24, and 26-27 are also non-obvious under § 103(a) for the reasons stated above in section A.

H. CLAIMS 25 IS NON-OBVIOUS UNDER 35 U.S.C. 103(a)

Claim 25 is also non-obvious under § 103(a) for the reasons stated above in section A.

I. CONCLUSION

In view of the foregoing, Applicant respectfully requests an early Notice of Allowance in this application.

Respectfully submitted,



Robert H. Hammer III  
Reg. No. 31,764  
Attorney for Applicant

Customer No. 29494  
Robert H. Hammer III, P.C.  
3121 Springbank Lane  
Suite I  
Charlotte, NC 28226  
Telephone: 704-927-0400  
Facsimile: 704-927-0485

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Docket No. 2000.16  
SERIAL NO. 09/851,242  
ART UNIT 1732

APPENDIX

1. A method of making a hollow fiber membrane contactor comprising the steps of:  
winding a hollow fiber fabric around a center tube,  
first potting the fabric and the tube together,  
forming thereby a unitized structure,  
placing the structure into a shell,  
second mold potting the structure and the shell together by injecting a potting material into a space between the structure and the shell, and  
forming thereby a cartridge.
2. The method of claim 1 wherein the first-mentioned potting being bead potting.
4. The method of claim 1 further comprising the step of heat-treating the cartridge.

5. The method of claim 4 wherein the heat-treating further comprises a first heat-treating and a second heat-treating.

16. The method of claim 1 wherein potting further comprises the first or the second potting with a material selected from the group consisting of thermosetting materials and thermoplastic materials.

17. The method of claim 16 wherein the thermosetting material being selected from the group consisting of epoxy and polyurethane.

18. The method of claim 16 wherein the thermoplastic material being selected from the group consisting of polyolefins and polyurethanes.

19. The method of claim 1 wherein placing the structure into a shell further comprises centering the structure in the shell.

21. A method of making a hollow fiber membrane contactor comprising the steps of:

winding a hollow fiber fabric around a center tube to a diameter of at least six inches,  
bead potting the fabric and the tube together,  
forming thereby a unitized structure,  
placing the structure into a shell,  
mold potting the structure and the shell together by injecting a potting material into a space between the structure and the shell, and  
forming thereby a cartridge.

22. The method of claim 21 further comprising the step of heat-treating the cartridge.

23. The method of claim 22 wherein the heat-treating further comprises a first heat-treating and a second heat-treating.

24. The method of claim 21 wherein bead or mold potting further comprises using a material selected from the group consisting of thermosetting materials and thermoplastic materials.



25. The method of claim 24 wherein the thermosetting material being selected from the group consisting of epoxy and polyurethane.

26. The method of claim 24 wherein the thermoplastic material being selected from the group consisting of polyolefins and polyurethanes.

27. The method of claim 21 wherein placing the structure into a shell further comprises centering the structure in the shell.

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